Decomposition of the Market Risk: Listed Location and Operation Location

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Abstract

This article finds that the effect of operation location on determining firm's market risk is higher than that of listing location. The contribution of this paper is that we provide evidence on the effect of foreign trading activeness on firm's local market beta, especially on firm in emerging market. We also support previous research about the effect of foreign operation on firm's world market beta and exchange rate. Our finding on the effect of foreign operation on firm's local market beta is contradicted with previous researches. We find that foreign operation increases firm's local market beta. This difference may be the result of using local currency denominated returns instead of US dollar denominated returns. We use local currency denominated returns because the effect of exchange rate is not the same for all stocks. The effect of foreign operation on world market beta has increased from 1999 to 2004. It implies that investors increasingly concern on firm's foreign operation exposure. The effect of foreign operation on exchange rate exposure is higher in market with clear trend and is higher in emerging market. The stock return of firm in goods industry is not sensitive to the change in exchange rate movement but the stock return of firm in services industry is sensitive to the change in exchange rate movement.

摘要

本文章找出營運地點比上市地點對公司風險更有影響。而本文章之貢獻在於發現某股票在海外市場交投越大，其本地啤打系數亦越小，特別是發展中國家之股票。本結果在海外營運對公司全球性風險及匯價風險亦與相關研究相符。而與相關研究不符之處在於，我們計算出海外營運風險對公司之本地市場啤打系數是不顯著的。其中一個原因在於我們所用的是以本地貨幣爲單位之回報而非以美元爲單位之回報。而我們亦認爲使用以本地貨幣爲單位之回報較合適，因爲匯價對不同股票的影響並不是一樣的。而我們亦發現海外營運對公司全球性啤打系數的影響不斷增加。這樣亦可表示投資者對公司之海外風險的關注與日俱增。而海外營運對匯價的影響在匯價有清晰的走勢時特別顯著，而對發展中地區的公司亦特別顯著。商品業之股價不受匯率波動之影響，而服務業之股價卻受匯率波動之影響。

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Contents

I. Introduction

Saudagaran (1988) provided empirical evidence that company with high ratio of overseas to total sales is likely to be cross-listed in foreign country. When it is true, the estimated effect of foreign operation on firm's market risk is biased without taking into account of the effect of listing location. On the other hands, the estimated effect of listing location on firm's market risk is also biased if it does not take into account of firm's foreign operation.

The main objective of this article is to filter out the pure effect of listing location and the pure effect of operation location. To control both effects on estimation, our sample only includes company, which is cross-listed and has foreign operation.

Individual stock return is measured by using local currency-denominated returns instead of using U.S. dollar-denominated returns. U.S. dollar-denominated returns are usually used in literatures. Brooks and Del Negro (2002) recognized that using U.S. dollar-denominated returns would lump nominal currency influence into country-specific shocks in international returns. They conducted the estimation on local currency-denominated returns and compared the result with those using U.S. dollar-denominated returns. Their result showed that the difference was negligible.

We use local currency denominated returns because we can estimate the effect of foreign operation on firm's exchange rate exposure when we uses local currency denominated returns. Another reason is that exchange rate effect is not homogenous across all firms. Jane and David (2003) reported that 1 in 4 of all Multi-national Enterprises in US had 0.68 exchange rate exposure between 1995 and 1999. They found that the coefficient is not constant over time. The coefficient is 0.55 for normal fluctuations and 2.8 for crisis periods. John, Patricia and Larry (2003) showed that the co-movement between stock returns and change in the foreign value of yen is positively correlated with firm's foreign involvement and inversely correlated with its size and debt to asset ratio. Therefore, it is inappropriate to assume that the effect of exchange rate shock on stock's return is the same for all stocks. However, using U.S. dollar denominated returns implies that the effect of exchange rate on stock's return is one for all stocks. It is because US dollar denominated returns are equal to the local currency denominated returns and the movement of exchange rate. It is the reason why we do not use US dollar denominated returns.

Literatures in American Depositary Receipts (ADRs) found that cross-listing increases firm's world market beta and decreases its local market beta. Karolyi (1998) examined foreign stocks listing on U.S. exchanges and reported that their home market beta fell and their U.S. market beta rose after they listed in U.S. Howe and

Madura (1990) studied U.S. companies listing in Europe or Japan. They showed that firm's U.S. market beta dropped for all countries and its foreign market beta rose for cross-listing in European countries. Their researches focus on the change in beta after cross listing. This paper does not analyze the change in beta after cross-listing. Instead, we focus on the effect of foreign trading activeness on firm's world market beta and its local market beta. We investigate whether a stock, which is heavily traded in foreign market, has higher world market beta and lower local market beta than a stock, which is thinly traded in foreign market.

Literatures also provided evidence on the effect of foreign operation on firm's beta. Brooks and Del Negro (2002) used multi-factors model to analyze the risk exposure of stock by adding the sales variable to capture the global effect on individual stock. Their result showed that a firm raising its international sales by 10 percent raises the exposure of its stock return to global shocks by 2 percent and reduces its exposure to country-specific shocks by 1.5 percent. Their research did not control for the cross-listing factor, so the estimated effect may lump up both foreign operation effect and foreign listing location effect. This paper is to estimate the pure effect of foreign operation on firm's world market beta and its local market beta. Therefore, we controls cross-listing effect by includes cross-listed firms only.

II. Data description

This dataset includes constituents of The Bank of New York Composite ADR Index in October 2004 which has foreign operation between 1999 and 2004. The reason of choosing this time horizon is that Worldscope database only provides foreign sales data for the nearest five years. This index includes all Depositary Receipts traded in The New York Stock Exchange (NYSE), The American Stock Exchange (AMEX) and NASDAQ.

We use weekly data because weekly data minimizes the problem of non-synchronous trading time in different countries comparing with daily data. Also, Kim, Szakmary and Mathur (1999) found that the price transmission process is not contemporaneous adjusted. In other words, they found that the effect of the market index and exchange rate in time t affect the price of ADR for time t, t+1 and t+2. Using daily data, the estimated effect of exchange rate and market index on individual stock is biased.

We collect data from two different databases. The closing prices of those stocks, the turnover of company's underlying stocks, the turnover of their ADRs, the local country indices, the exchange rates and the MSCI world index from January 1999 to October 2004 are extracted from DataStream. The total sales and the foreign sales for each firm are extracted from Worldscope.

There are 21 companies in the data. ADRs in China and Hong Kong are not included because they adopt fixed exchange rate. It is because a slightly movement in exchange rate may imply revaluation of the exchange rate. Therefore, stocks in these locations are highly sensitive to the exchange rate. Including them in estimation, the estimated exchange rate sensitivity is biased. Some firms have been dropped due to missing foreign sales data or missing stock price data.

Appendix 1 provides the number of companies in each developed market. Appendix 2 showed the number of firms in emerging market. Firms in developed market constitute 84% of the sample, especially firms in European country which accounts for 67% of the whole sample. In Appendix 3, the number of companies in each country and each industry is provided. The sample is distributed in 36 different industries, for example, Technology, hardware and equipment (24), Pharmacy and biotechnology (13), Software and computer service (12) Fixed line telecom (12) and Banks (10).

III. Market risks for stocks

In this section, we explore theoretical rationale behinds the effect of listing location and operation location on firm's risk exposure. Gordon formula predicts that

the price of a share is affected by the dividend in current period (D), the required return (r) and the growth rate (g).

$$P_t = D_o (1 + g) / (r - g) \qquad (1)$$

The dividend in current period is realized, so it is expected to be constant. Therefore, price is a function which is decreasing with respect to r and increasing with respect to g. Required return depends on the market premium, so it is highly affected by the listing market performance. On the other hand, growth rate mainly depends on firm's fundamental value, so it is mostly affected by the operation location condition.

III. (1) Listing Location

In Capital Asset Pricing Model (CAPM) by Sharpe (1964) and Linter (1965), r is defined as

$$r = r_f + \beta R_p \qquad (2)$$

r_f denotes the risk free rate. β denotes the stock's sensitivity to systematic risk on a portfolio. R_p denotes the expected market premium, which is equal to the market return minus the risk free rate.

$$R_p = R_m - r_f \qquad (3)$$

Rm is the expected market return which is equal to the expected market value of the portfolio at the end of the period (R*) minus the current market value of the portfolio (R).

$$R_m = R^* - R \qquad (4)$$

Substitutes (3) into (4),

$$R_m = R^* - R - r_f \qquad (5)$$

Substitutes (5) into (2),

$$r = r_f + \beta(R^* - R - r_f) \qquad (6)$$

Substitutes (6) into (1)

$$P_t = C_o (1 + g) / (r_f + \beta(R^* - R - r_f) - g) \qquad (7)$$

Equation 7 implies that an increase in the value of market portfolio leads to stock price increases. If all investors hold world market diversified portfolio, using the world market index to represent R is appropriate. However, the existing of home bases bias implies that the domestic investors do not hold the optimal level of foreign asset according to the value-weighted proportion. In other words, they hold a portfolio that overweighs on domestic stock. Therefore, a stock, which is heavily traded in foreign market, is expected to have greater exposure to global risk and lower exposure to domestic risk.

III. (2) Operation location

Growth rate of a company depends on its firm specific growth rate and its underlying economics growth rate. To estimate economics growth rate, the best estimator is the market index in that country. Market index covers a wide range of

companies in that country. Therefore, rise on the index implies an increase in the investor's expectation on the overall economics environment in that country. When company operates in more than one country, both domestic economics environment and foreign economics environment affect its fundamental value.

We denote the proportion of fundamental value generates from foreign country is θ and the proportion of fundamental value generates from local country is $(1 - \theta)$. As the growth rate is denominated using local currency, the growth rate in foreign market have to adjust for the exchange rate.

$$g = (1 - \theta)\, g_l + \theta\, g_f\, E \qquad (8)$$

E is the amount of local currency to exchange for one dollar of US dollar.

Different stocks have different sensitivities to the economics cycle. For a highly-leveraged company, its stock price is highly sensitive to the market index. We denote β_2 is the sensitivity of firm's growth rate on the stock market index.

$$g_l = \beta_{l2}\, R_l \qquad (9)$$

$$g_f = \beta_{f2}\, R_f \qquad (10)$$

$$g = (1 - \theta)\, (\beta_{l2}\, R_l) + \theta\, (\beta_{f2}\, R_f)\, e \qquad (11)$$

β_{l2} denotes the growth rate's sensitivity to the local market index. β_{f2} denotes the growth rate's sensitivity to the foreign market index. R_l denotes the return of the local market index. R_f denotes the return of the foreign market index. e denotes the change in the exchange rate.

III. (3) Measurements

There are some indictors to estimates the degree of firm's operation in a specific location. Cavaglia, Cho, and Singer (2001) used percentage of sales to measure the degree to which firms operate internationally. Brooks and Del Negro (2003) found that higher sales ratio, asset ratio and income ratio could increase firm's sensitive on the global stock market and decrease its sensitive on the country stock market.

There are four indicators which are appropriate to measure the degree of firm's operation location. Firm's value is mostly determined by its profitability and solvency. We identify four elements on income statement and balance sheet that could capture these two capabilities. They are Revenue, Cost, Asset and Liabilities.

For an exporter in Hong Kong, world economics situation is important to forecast its future revenue. Therefore, its world market beta is also higher. High foreign sales also increase firm's exposure on exchange rate. It is because local currency depreciation increases its competitiveness in the world market.

When firm's production line is in developing country, it exposes to the developing country risk. When world economy recovers, world salary level and the cost of production increase. Therefore, the increase in revenue due to increase in demand is offset by the increase in cost. Given appreciation of local currency, cost in

developing country decreases in terms of local currency. As the whole, cost affects firm's sensitivity to country risk and exchange rate risk.

Foreign asset increases firm's global market beta and its sensitivity to exchange rate. For a company which has a large proportion of foreign asset, recovery of foreign economy increases value of the capital in foreign country. Therefore, the asset of this company increases and the stock price also increases. On the other hand, local currency appreciation decreases value of the foreign asset denominated in local currency. Hence, it causes a decrease in firm value.

Foreign liabilities decrease firm's global market beta. When global economy recovers, its interest rate is likely to increase. Company is required to re-finance its loan with higher interest rate, which decreases its profits. For exchange rate risk, foreign currency denominated liabilities decrease firms' value when local currency depreciates. The case of Argentina currency crisis and Asia Financial Crisis provided strong evidence on positive correlation between stock price of a firm with foreign debt and depreciation of the local currency. It implied that many firms do not fully hedge against its exchange rate risk. Therefore, liabilities are also an important factor to assess firm's exchange rate risk.

This article use sales to measure the degree of firm's operation in foreign country. Foreign cost and foreign liabilities are difficult to assess in the annual

reports. As assets are record in book value, there is a bias on over-estimating the foreign proportion. The timing to invest in oversea is usually later than the timing to invest in local market. Inflation increases the book value of new investment and depreciation decreases the book value of old asset. Therefore, the degree of foreign operation is overestimated. Although profit is also used in literatures, we did not use it due to its instability overtime and the problem of negative profit.

IV. The model

Both operation location and leading location affect firm's world market beta, its local market beta and its exchange rate exposure. We use two-stage regression to estimate the effect of operation location and the effect of listing location on firm's market risk. First of all, we use the three factors model which is frequently used in evaluating ADRs risk. For example, Kim, Szakmary and Mathur (1999) used this three factors model to evaluates the price transmission dynamics for ADRs.

$$r_{it} = \mu_i + \beta_{fi} R_{ft} + \beta_{li} R_{lt} + \beta_{ei} e_t + \varepsilon_{i,t} \qquad (12)$$

i denotes a specific stock which is from 1 to I. t denotes time period which is from 1 to T. μ denotes intercept term of the regression. ε denotes error term for firm i at time t. β_f denotes the estimated stock's sensitivity to the world market index for firm i. β_l denotes the estimated stock's sensitivity to the local market index for firm i. β_e denotes the estimated stock's sensitivity to the exchange rate for firm i

In this regression result, the estimated beta is mixed with both foreign operation effect and foreign stock turnover effect. We use second set of regressions to estimate the pure effect of operation location and the effect of listing location. After we get the betas for each firm, we use beta as the dependent variable and use the proportion of foreign stock turnover (λ) and the proportion of foreign operation (θ) as the independent variables. The following three regressions estimate the effect of foreign operation and the effect of foreign turnover on firm's risk exposures.

$$\beta_{fi} = \mu_f + \beta_{f1}\ \lambda_i + \beta_{f2}\ \theta_i + \varepsilon_{fi} \qquad (14)$$

$$\beta_{li} = \mu_l + \beta_{l1}\ \lambda_i + \beta_{l2}\ \theta_i + \varepsilon_{li} \qquad (15)$$

$$\beta_{ei} = \mu_e + \beta_{e1}\ \lambda_i + \beta_{e2}\ \theta_i + \varepsilon_{ei} \qquad (16)$$

We made six hypotheses on these six variables.

Hypothesis 1: $\beta_{f1} > 0$

Hypothesis 2: $\beta_{l1} < 0$

We expect that a stock, which is heavily traded in foreign countries, has higher world market beta and lower local market beta.

Hypothesis 3: $\beta_{f2} > 0$

Hypothesis 4: $\beta_{f2} < 0$

Brooks and Del Negro (2003) had demonstrated that increase on the foreign operation increase a firm's world market beta and decrease it's local market beta. We examine whether the pure operation location effect is also positive on world market beta and negative on local market beta.

Hypothesis 5: $\beta_{e1} = 0$

Hypothesis 6: $\beta_{e2} < 0$

Exchange rate exposure increases when company has higher foreign operation. On the contrary, exchange rate exposure does not depend on the trading activeness in foreign market.

V. Empirical Results

V. (1) Summary statistics

Appendix 4 provides summary statistics for foreign stock turnover, foreign sales, world market beta, local market beta and exchange rate exposure. The mean of θ is larger than the mean of λ. More than 50% of stocks have less than 6% of stock turnover in foreign country. Appendix 5 provides the correlation among each variable.

In appendix 7, we find that foreign sales are normally distributed with mean 0.58 and standard derivation 0.26. The correlation of the proportion of foreign sales and the proportion of trading activeness is not statistically different from 0. It implies that the foreign trading activeness does not depend on company's proportion of foreign sales.

V. (2) Diagnostics test

Table 1 provides the diagnostic test for the regression models. The regression models pass the Functional Form test and Heteroscdasticity test. However, the models show non-normal distribution. The p–value we estimated in this paper assumes normal distribution. Therefore, this estimated p-value may be different from the p-value under non-normal distribution.

Table 1
Diagnostic Test for the regression models
Regression 1: $\beta_{fi} = \mu_f + \beta_{f1}\ \lambda_i + \beta_{f2}\ \theta_i + \varepsilon_{fi}$
Regression 2: $\beta_{li} = \mu_l + \beta_{l1}\ \lambda_i + \beta_{l2}\ \theta_i + \varepsilon_{li}$
Regression 3: $\beta_{ei} = \mu_e + \beta_{e1}\ \lambda_i + \beta_{e2}\ \theta_i + \varepsilon_{ei}$

	Regression 1	Regression 2	Regression 3
Functional Form	0.62956	0.56724	1.4851
	(0.428)	(0.451)	(0.223)
Normality	164.7436	215.346	11.569
	(0.000)	(0.000)	(0.000)
Heteroscedasticity	0.68914	0.31935	0.09468
	(0.406)	(0.572)	(0.758)

Serial correlation use Lagrange multiplier test of residual serial correlation
Functional Form use Ramsey's RESET test using the square of the fitted values
Normality use test of skewness and kurtosis of residuals
Heteroscedasticity use the test for the regression of squared residuals on squared fitted values
The number in the blank is the p-value

V. (3) The coefficients

Table 2

Regression result for all firms in the whole period

$r_{it} = \mu_i + \beta_{fi} R_{ft} + \beta_{li} R_{lt} + \beta_{ei} e_t + \varepsilon_{i,t}$

$\beta_{fi} = \mu_f + \beta_{f1} \lambda_i + \beta_{f2} \theta_i + \varepsilon_{fi}$

$\beta_{li} = \mu_l + \beta_{l1} \lambda_i + \beta_{l2} \theta_i + \varepsilon_{li}$

$\beta_{ei} = \mu_e + \beta_{e1} \lambda_i + \beta_{e2} \theta_i + \varepsilon_{ei}$

Beta	Value	t – statistic
β_{f1}	0.1859	1.0904
β_{f2}	0.4623	2.6713***
β_{l1}	0.1007	0.5407
β_{l2}	0.3687	1.9499*
β_{e1}	0.2517	0.2879
β_{e2}	0.5432	0.0246**

*1% significance level, ** 5% significance level and *** 1% significance level

Table 2 shows the result of the coefficients. For foreign stock turnover, all three betas are not statistically significant from zero. The sign of β_{f1} is in the direction that we expected but it is not as for the β_{l1}. For β_{e1}, it is not statistically different from zero. It is consistent with what we expect that activeness on foreign stock turnover does not increase firm's exchange rate exposure.

For foreign operation, β_{f2} and β_{e2} are statistically significant and are positive which is in the direction that we expected. In other words, foreign operation would increase a stock's sensitivity to world market index and exchange rate. It implies that firm is not fully hedged their exchange rate exposure. However, β_{l2} is also significant but in the direction that is contradicted with our expectation and the previous researches, such as Brooks and Del Negro (2002). The result implies that when a firm

has higher proportion foreign operation, it also has higher local market beta. This result is not consistent with the previous researches.

If domestic factor is correlated with international factor, it could disturb the estimation of coefficients. We also consider the problem of correlation among the independent variables: the local market index, the world market index and the exchange rate. Therefore, we use two-stage regression technique to estimate the coefficients to eliminate the exchange rate effect and world market effect on the local market return.

$$R_{lt} = \mu + \alpha_f R_{ft} + \alpha_e e_t + \hat{e}_t \qquad (17)$$

$$r_{it} = \mu_i + \beta_{fi} R_{ft} + \beta_{li} \hat{e} + \beta_{ei} e_t + \varepsilon_{i,t} \qquad (18)$$

In equation 17, $\hat{e}$ is the pure movement of local market index after reducing the world market effect and exchange rate effect on local market index. Afterwards, we substitute it to equation 13 to get equation 18 to estimate the coefficients. The result is shown in Table 3. The result is the same in table 2. It means that correlation among the variables does not affect the robustness of the result.

Table 3

Regression result for all firms in the whole period using two stage regression technique

$R_{lt} = \mu + \alpha_f R_{ft} + \alpha_e e_t + \hat{e}_t$

$r_{it} = \mu_i + \beta_{fi} R_{ft} + \beta_{li} \hat{e} + \beta_{ei} e_t + \varepsilon_{i,t}$

$\beta_{fi} = \mu_f + \beta_{f1} \lambda_i + \beta_{f2} \theta_i + \varepsilon_{fi}$

$\beta_{li} = \mu_l + \beta_{l1} \lambda_i + \beta_{l2} \theta_i + \varepsilon_{li}$

$\beta_{ei} = \mu_e + \beta_{e1} \lambda_i + \beta_{e2} \theta_i + \varepsilon_{ei}$

Beta	Value	t – statistic
β_{f1}	0.2641	1.379
β_{f2}	0.7997	4.1121***
β_{l1}	0.1025	0.5493
β_{l2}	0.3741	1.9749**
β_{e1}	0.0494	0.1934
β_{e2}	0.5717	2.2024**

** 5% significance level and *** 1% significance level

V. (4) Comparing the result with US dollar-denominate returns

One of the differences between this analysis and previous analysis, such as Brooks and Del Negro (2002), is the choice of currency denominated returns. They used US dollar-denominated returns to estimate the coefficients instead of local currency-denominated returns. They found that foreign sales increase firm's world market beta and decrease its local market beta. As their analysis does not include exchange rate and foreign stock turnover, we also do not include them in the following regressions. Table 4 reports the simplified version results. To adjust for the difference of choice of currency denominated returns, we estimate the coefficients using US dollar-denominated returns.

We know that the US dollar-denominated return r^{us}_{it} is:

$$r^{us}_{it} = r_{it} - e_t$$

Therefore, we substitute it in the dependant variable to estimate the coefficients. The estimated coefficients using US dollar denominated returns are showed in Table 5. β_{f2} is larger than the one used local currency denominated returns and β_{l2} is smaller than the one used local currency denominated returns. It seems that adjusting the stock's return by exchange rate has the effect of enlarging the world market beta and decreasing the local market beta. If it is true, the beta of the foreign operation on world market index increase and that on the local market index decrease when stock's return is adjusted by double exchange rate change. Table 6 provides the result this new estimation. The world market beta further rise to 0.6691 and the local market beta continuously drop to 0.1044. Adjusting the stock's return by exchange rate has the effect of enlarging the world market beta and decreasing the local market beta. We provide a possible explanation of this phenomenon in the following part.

Table 4

Regression result for all firms in the whole period without using listing location variable

$r_{it} = \mu_i + \beta_{fi} R_{ft} + \beta_{li} R_{lt} + \varepsilon_{i,t}$

$\beta_{fi} = \mu_f + \beta_{f2}\ \theta_i + \varepsilon_{fi}$

$\beta_{li} = \mu_l + \beta_{l2}\ \theta_i + \varepsilon_{li}$

Beta	Value	t – statistic
β_{f2}	0.3955	2.371**
β_{l2}	0.4209	2.317**

** 5% significance level

Table 5

Regression result for all firms in the whole period without using listing location variable and using US dollars denominated returns

$r_{it} - e_t = \mu_i + \beta_{fi} R_{ft} + \beta_{li} R_{lt} + \varepsilon_{i,t}$

$\beta_{fi} = \mu_f + \beta_{f2} \theta_i + \varepsilon_{fi}$

$\beta_{li} = \mu_l + \beta_{l2} \theta_i + \varepsilon_{li}$

Beta	Value	t – statistic
β_{f2}	0.5415	3.3127***
β_{l2}	0.2753	1.5477

*** 1% significance level

Table 6

Regression result for all firms in the whole period without using listing location variable and doubling the effect of exchange rate movement on the stock returns

$r_{it} - 2e_t = \mu_i + \beta_{fi} R_{ft} + \beta_{li} R_{lt} + \varepsilon_{i,t}$

$\beta_{fi} = \mu_f + \beta_{f2} \theta_i + \varepsilon_{fi}$

$\beta_{li} = \mu_l + \beta_{l2} \theta_i + \varepsilon_{li}$

Beta	Value	t – statistic
β_{f2}	0.6691	3.7468***
β_{l2}	0.1044	0.557

*** 1% significance level

Table 7

The correlation among exchange rate, local market index and world market index for the firms

	Correlation between exchange rate and local market index	Correlation between exchange rate and world market index
Number of companies	217	217
company has significant positive correlation**	148	8
Company has significant negative correlation**	42	47
Mean value	0.1244	-0.0361

** 5% significance level

The formula for the t-statistics calculation for the correlation is $r\ (n - 2)^{1/2} / (1 - r^2)^{1/2}$

We identified two facts which are useful for explanation. First, we find out that there are positive correlation between the local market index and the exchange rate as well as the negative correlation between the world market index and the exchange

rate. The result is shown in Table 7. Second, table 2 reports that companies which have higher proportion of foreign sales have higher sensitivity to the exchange rate risk.

When the exchange rate increases (local currency depreciates), the local market index is likely to increase because the value of the company's foreign segment increase in terms of local currency. Using the local currency-denominated returns, a stock which has high proportion of foreign sales is likely to increase more due to the increase on exchange rate and the local market index. Using the US dollar-denominated return, increase in return is not as large as the previous case as it is offset by the exchange rate increase. When the exchange rate decreases (local currency appreciates), the local market index is likely to decrease. Using the local currency denominated return, stock price is likely to decrease more due to the decrease on exchange rate and the local market index. Using the foreign currency denominated return, decrease in return is not as large as the previous case as it is offset by the exchange rate decrease. Therefore, the estimated beta is lower using the US dollar currency-denominated approach.

For the world market beta, the explanation is similar but it is exactly in the opposite direction. World market index is denominated using US dollar. Exchange rate is also using US dollar as the denominator. When US dollar appreciates, the

world market portfolio in terms of US-dollar is lower. Therefore, the exchange rate and the world market index have negative correlation.

When the exchange rate increases, the world market index is likely to decrease. Using the local currency-denominated returns, stock price is likely to have less volatility because increase in exchange rate is offset by decrease in the world market index. Using US dollar-denominated returns, return is dropped significantly due to the increase in the exchange rate and decrease in the world market index. When the exchange rate decreases, the world market index is likely to increase. Using the local currency-denominated returns, stock price is likely to have less change because increase in world market index is offset by decrease in exchange rate. Therefore, the co-movement between exchange rate and the world market index increases when using US dollar denominated returns.

It explains why estimated coefficient using local currency denominated returns is different from estimated coefficient using US dollar denominated returns. We think that using local currency denominated returns is more appropriate because it does not require the assumption that exchange rate effect is homogenous on each stock.

VI. Sub-period Analysis

This section provides the estimated coefficients in three different periods. The data is between January, 1999 and October, 2004. The early period is a bull market which is driven by the technology bubble. The middle period is a bearish market due to the collapse of technology bubble. The late period is a bull market due to the world economics discovery and the depreciation of US dollar. Lam (2001) showed that the estimated security market line in down market is negatively steeper than is the positively sloped in up market. Concerning the data covers both up and down markets, the data is divided into three periods, January 1999 to March 2000, April 2000 to October 2002 and November 2002 to October 2004. The reason for choosing March 2000 is that the bull market is driven by technology bubble. Therefore, using the month which NASDAQ hit it's highest as the end of the bull market is appropriate. As bull market in 2003 is due to the world economics recovery and US market is the largest stock market in the world, we choose the month which Dow Jones Index hit its lowest. The summary statistics for the first period, second period and third period are shown in appendix 12, appendix 13 and appendix 14 respectively. The foreign stock turnover and foreign sales is slightly increasing from 1999 to 2004. Stock's exchange rate exposure increases over time. For world market beta and local market beta, their

coefficients in third period are significant different from first period and second period.

Table 8
Regression result for all firms for three different periods

	01/1999 -03/2000	04/2000 – 10/2002	11/2002 – 10/2004
β_{f1}	-0.9939	0.3108	0.5368
	(-1.6193)	(1.4069)	(0.1898)
β_{f2}	-0.9826*	0.605***	1.5034***
	(-1.7815)	(2.6012)	(3.1981)
β_{l1}	0.9026	0.1946	-0.2646
	(1.3809)	(0.7854)	(-1.1916)
β_{l2}	0.2938	0.6302**	-0.0707
	(0.5003)	(2.4156)	(-0.2758)
β_{e1}	-0.7914	0.6279**	0.0125
	(-1.2762)	(2.5592)	0.0366
β_{e2}	0.8825	0.2214	1.6161***
	(0.4917)	(0.8572)	(4.0852)

5% significance level and * 1% significance level

The number in the blank is the t - statistic

Table 8 shows the result of betas in the three periods. β_{f2} is statistically negative in period 1. β_{f2} is significant positive in the last two periods. It implies that increase in foreign sales increases firm's world market beta no matter bearish market and bull market. The result that β_{f2} increases over time implies that foreign operation becomes more important over time on explaining stock's returns. In other words, investors increasingly concern on the figure of firm's foreign operation. Given the same proportion of foreign sales and the same increase in foreign market index, stock's return nowadays increase more than stock's return in five years ago.

For local market beta, β_{l2} is not statistically significant positive in all period. It indicates that foreign sales do not change a stock's local market beta no matter bull or bearish market.

For exchange rate exposure, β_{e1} is significant positive in second period but the coefficient is negative in first period and nearly zero in third period. β_{e2} is significant positive in third period. The coefficient is also positive for first and second periods. One possible explanation for a jump in β_{e2} is that exchange rate beta is also sensitive to up or down in currency market During third period, US dollar has a clear deprecation trend. For example, EUR/USD increases from 1 to 1.3 during the third period. In a currency market where there is no clear trend, investor may anticipate any in exchange rate movement will reverse soon. Therefore, the stock price does not fully reflect the change in exchange rate.

VII. Country Analysis

Sample contains firms from different countries. Country is classified as developed market and emerging market. Previous researches found out that the effect of cross-listing is different between firm in developed market and firm in emerging markets. Serra (1999) used stocks in emerging market and provided supportive evidence for the segmentation hypothesis which implies dual –listing effects are more

significant for emerging markets' listing. It is because the lower the covariance between the first listing market and the second listing market, the higher the diversification benefit brings to the investors.

From appendix 1 and appendix 2, we find that firms in emerging market are less than 20% of the sample and they are across 10 different countries. Comparing the summary statistic for developed market and emerging market in appendix 15 and appendix 16, we find out that there is a critical difference between these two statistics. ADR from emerging market is actively traded which has average $\lambda = 0.4316$ but average $\lambda = 0.1477$ for developed market. It is reasonable because firm's in emerging market provides higher diversification benefit to the US investors. Therefore, they are relatively willing to trade those stocks. For foreign operation, the situation is in opposite. Emerging market's average $\theta = 0.4639$ which is lesser than the average of developed market $\theta = 0.6042$.

In table 9, we estimated the coefficients for the developed market and emerging market separately. β_{f2} is positively significant for both type of countries. β_{l1} is significant negative for emerging market but not for developed market. It supports with Serra (1999) that cross-listing significantly decrease the local market beta for firm in emerging market. However, the result does not show (β_{l2} is not statistically

different from zero) that there is significant change on firm foreign market beta when there is a increase in trading activeness in foreign market.

β_{e2} is significant positive only for emerging markets. In other words, foreign sales in emerging market increase firm's exchange rate exposure more than that in developed market because emerging market currency is more volatile. Therefore, investors pay more attention on the proportion of foreign segment for a stock, so the stock price is more sensitive to the exchange rate.

Table 9
Regression result for firms in developed market and emerging market

	Developed market	Emerging market
β_{f1}	0.388*	0.0577
	(1.656)	(0.3444)
β_{f2}	0.3648*	0.4618**
	(1.6759)	(2.6869)
β_{l1}	0.1188	-0.6239**
	(0.478)	(-2.3266)
β_{l2}	0.5144**	0.1358
	(2.2270)	(0.4937)
β_{e1}	0.3126	-0.3711
	(1.0398)	(-0.7247)
β_{e2}	0.3575	1.471**
	(1.2798)	(2.8002)

** 5% significance level and *** 1% significance level

The number in the blank is the t - statistic

VIII. Industrial Analysis

Firm's beta is different not only cross country but also across industry. Allayannis and Ihrig (2001) found out that 4 of 18 industry groups are significantly

exposed to exchange rate movements using a sample of US manufacturing industry between 1979 and 1995. Griffin and Karolyi (1998) showed that global industry effects are important than country effects for traded goods industry than for non-traded goods industry. In our sample, firms are distributed in 36 industries. We classified these 36 industries to goods industry and services industry. It aims to examine whether the effect of foreign operation and foreign stock turnover is the same between goods industry and services industry.

Appendix 17 and Appendix 18 reports the summary statistics for goods industry and services industry. Goods industry has higher foreign operation and higher foreign stock turnover. Services industry has higher world market beta, local market beta and exchange rate exposure. It implies that services industry is more sensitive to the market movements.

Table 10 shows that β_{i2} is positive significant for both goods industry and services industry. It implies that foreign operation increases firm's world market beta for both industries. However, foreign stock turnover increase firm's world market beta only for services industry. We find that foreign operation increases firm's local market beta for goods industry. One of the reasons is that high foreign operation implies investment on foreign country. If the expansion is financed by debt, company will bear higher systematic risk.

β_{e2} is positive significant only for services industry. Goods industry usually requires inputting materials from foreign countries. When local currency depreciates, the increase in revenue is offset by the increase in cost. For services industry, materials is not major component of it's cost structure. Therefore, it can benefit more from its country currency depreciation

Table 10
Regression result for goods industry and for services industry

	Goods industry	Services industry
β_{f1}	0.0207	0.6976**
	(0.0996)	(2.3571)
β_{f2}	0.4549**	0.5511**
	(2.0514)	(2.0421)
β_{l1}	0.1944	0.0186
	(0.9006)	(0.0572)
β_{l2}	0.5711**	0.2429
	(2.474)	(0.8208)
β_{e1}	0.1705	0.6023
	0.5883	(1.5396)
β_{e2}	0.3149	1.1603***
	1.0159	(3.2523)

** 5% significance level and *** 1% significance level

The number in the blank is the t - statistic

IX. Conclusions

We find out that operation location is more useful on determining firm's world market beta, local market beta and exchange rate exposure comparing with listing location. The intuition behind is that the objective of investing in stock market is to earn capital gain and dividend. In the long run, these two figures are determined by

the fundamental value of the firm, instead of the market situation of its listing location. Therefore, investors concern more on the operation location situation than its listing location situation.

We find out empirical evidence that stock with higher foreign operation usually has higher foreign stock turnover. Therefore, the estimated effect of foreign operation or the estimated effect of foreign stock turnover on firm's market risk is biased if the analysis does not take another effect into account.

The effect of foreign operation and foreign stock turnover on firm's local market beta and world market beta are not the same. This paper contributed to the literatures on the effect of foreign trading activeness on firm's risk exposure. Foreign trading activeness decreases firm's local market beta, especially for firm in emerging market. Foreign operation increases firm's world market beta and exchange rate exposure. The effect on local market beta is not statistically significant, which is different from with previous researches. One possible explanation on this phenomenon is that we use local currency denominated returns instead of US dollar denominated returns, which is usually used in literatures. We think that using local currency denominated returns is more reasonable because the effect of exchange rate is not the same for any stock

The effect of foreign operation is different across market condition, countries and industries. The effect of foreign operation on world market beta has increased from 1999 to 2004. It implies that investors increasingly concern on firm's foreign operation exposure. The effect of foreign operation on exchange rate exposure is higher in market with clear trend and is higher in emerging market. For some industries, the effect of foreign operation on world market beta, local market beta and exchange rate exposure are different from the sample average, such as Electronic & Electrical Equipment and Software & Computer Service.

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XI Appendix

Appendix 1

Distribution of companies across developed markets

Developed market	Number of firms
Australia	12
Denmark	2
Finland	3
France	23
Germany	17
Ireland	9
Italy	5
Japan	21
Netherlands	17
New Zealand	1
Norway	6
Singapore	2
Spain	1
Sweden	4
Switzerland	8
United Kingdom	51
Total	182

The sample is collect from the constituents in The Bank of New York Composite ADR Index in October 2004. Some countries are not included due to the incomplete data or lack of the data in that country.

Appendix 2

Distribution of companies across developed markets

Emerging Markets	Number of firms
Argentina	1
Brazil	5
Chile	4
India	3
Israel	4
Korea	1
México	10
South Africa	5
Taiwan	1
Turkey	1
Total	35

The sample is collect from the constituents in The Bank of New York Composite ADR Index in October 2004. China and Hong Kong are not included in the sample because their exchange rate is pegged with U.S. dollar. Some countries are not included due to the incomplete data or lack of the data in that country.

Appendix 3a

Distribution of companies sorted by country and industry

	Argentina	Australia	Brazil	Chile	Denmark	Finland	
Aerospace & Defense				1			
Automobiles & Parts							
Banks			3				
Beverages							
Chemicals							
Construct.&Materials			2		1		
Electricity					1		
Electron.&ElectricEq							
Fixed Line Telecom.			1			1	
Food &Drug Retailers							
Food Producers				2			
Forestry & Paper				1			1
Gas,H20&Multiutility							
General Finance							
General Industrials			1				
General Retailers							
HealthCareEquip.&Ser							
Household Goods							
Industrial Engineer.							1
Industrial Metals		1	1	1			
IndustrialTransport.							
Leisure Goods							
Life Insurance							
Media			1				
Mining			1				
Mobile Telecom							
Nonlife Insurance							
Oil & Gas Producers			1				
OilEquip.,Serv.&Dist							
Personal Goods							
Pharma. & Biotech			1			1	
Software&ComputerSvc							
Support Services							
Tech.Hardware&Equip					1		1
Tobacco							
Travel & Leisure					1		
Total		1	12	5	4	2	3

This paper use The Bank of New York industrial classification on the ADR.

Appendix 3b

Distribution of companies sorted by country and industry

	France	Germany	India	Ireland	Israel	Italy	
Aerospace & Defense							
Automobiles & Parts			1				1
Banks			1		2		
Beverages							
Chemicals		1	2			1	
Construct.&Materials		1			1		
Electricity							
Electron.&ElectricEq			2				
Fixed Line Telecom.		1	1				1
Food &Drug Retailers							
Food Producers		1					
Forestry & Paper							
Gas,H20&Multiutility		2	1				
General Finance							
General Industrials							
General Retailers							
HealthCareEquip.&Ser					2		
Household Goods					1		
Industrial Engineer.			2				
Industrial Metals							
IndustrialTransport.							
Leisure Goods		1					
Life Insurance							
Media		3					
Mining							
Mobile Telecom							
Nonlife Insurance			1				
Oil & Gas Producers		1					1
OilEquip.,Serv.&Dist		2					
Personal Goods							2
Pharma. & Biotech		1	2	1	1	1	
Software&ComputerSvc		5	2	2	1	1	
Support Services							
Tech.Hardware&Equip		3	2			1	
Tobacco							
Travel & Leisure		1			1		
Total		23	17	3	9	4	5

Appendix 3c

Distribution of companies sorted by country and industry

	Japan	Korea	México	Netherlands	New Zealand	
Aerospace & Defense						
Automobiles & Parts		3				
Banks		1				
Beverages		1		1		
Chemicals					1	
Construct.&Materials				2	1	
Electricity						
Electron.&ElectricEq		3				
Fixed Line Telecom.			1		1	1
Food &Drug Retailers					1	
Food Producers				1	1	
Forestry & Paper						
Gas,H20&Multiutility						
General Finance		1			1	
General Industrials						
General Retailers				1		
HealthCareEquip.&Ser						
Household Goods		1				
Industrial Engineer.		1				
Industrial Metals				2	1	
IndustrialTransport.					1	
Leisure Goods		6			1	
Life Insurance					2	
Media				1		
Mining						
Mobile Telecom				2		
Nonlife Insurance						
Oil & Gas Producers					1	
OilEquip.,Serv.&Dist						
Personal Goods						
Pharma. & Biotech						
Software&ComputerSvc		1				
Support Services					1	
Tech.Hardware&Equip		3			4	
Tobacco						
Travel & Leisure						
Total		21	1	10	17	1

Appendix 3d

Distribution of companies sorted by country and industry

	Norway	Singapore	South Africa	Spain	Sweden
Aerospace & Defense					
Automobiles & Parts					
Banks					
Beverages					
Chemicals					
Construct.&Materials					
Electricity					1
Electron.&ElectricEq					
Fixed Line Telecom.					1
Food &Drug Retailers					
Food Producers					
Forestry & Paper				1	
Gas,H20&Multiutility					
General Finance					
General Industrials					
General Retailers					
HealthCareEquip.&Ser					
Household Goods					1
Industrial Engineer.					1
Industrial Metals		1			
IndustrialTransport.		1			
Leisure Goods					
Life Insurance					
Media				1	
Mining				2	
Mobile Telecom		1			
Nonlife Insurance					
Oil & Gas Producers		1		1	
OilEquip.,Serv.&Dist		2			
Personal Goods					
Pharma. & Biotech					
Software&ComputerSvc					
Support Services					
Tech.Hardware&Equip			2		1
Tobacco					
Travel & Leisure					
Total		6	2	5	1	4

Appendix 3e

Distribution of companies sorted by country and industry

	Switzerland	Taiwan	Turkey	United Kingdom	Total	
Aerospace & Defense						1
Automobiles & Parts					1	6
Banks					3	10
Beverages					2	4
Chemicals		2			2	9
Construct.&Materials						8
Electricity					1	3
Electron.&ElectricEq					1	6
Fixed Line Telecom.		1			2	12
Food &Drug Retailers						1
Food Producers					2	7
Forestry & Paper						3
Gas,H20&Multiutility					2	5
General Finance					1	3
General Industrials					1	2
General Retailers						1
HealthCareEquip.&Ser					1	3
Household Goods					1	4
Industrial Engineer.						5
Industrial Metals		1			1	9
IndustrialTransport.						2
Leisure Goods					1	9
Life Insurance						2
Media					3	9
Mining					3	6
Mobile Telecom				1	2	6
Nonlife Insurance		1			1	3
Oil & Gas Producers					3	9
OilEquip.,Serv.&Dist						4
Personal Goods						2
Pharma. & Biotech		1			4	13
Software&ComputerSvc						12
Support Services		1			3	5
Tech.Hardware&Equip		1	1		4	24
Tobacco					3	3
Travel & Leisure					3	6
Total		8	1	1	51	217

Appendix 4

Summary statistics of the regression analysis

Statistics	λ	θ	β_f	β_l	β_e
Mean	0.1935	0.5816	0.2660	0.7355	0.0803
Standard Derivation	0.2634	0.2594	0.6685	0.7229	0.9220
Top Quatile	0.2796	0.7902	0.5439	1.1365	0.3273
Median	0.0559	0.603	0.1676	0.7924	0.0812
Second Quatile	0.0133	0.3776	-0.1037	0.3919	-0.1513

λ is the proportion of foreign stock turnover for firm i, θ is the proportion of fundamental value generates from foreign country for firm i, β_f is the estimated stock's sensitivity to the world market index for firm i, β_l is the estimated stock's sensitivity to the local market index for firm i, β_e is the estimated stock's sensitivity to the exchange rate for firm i.

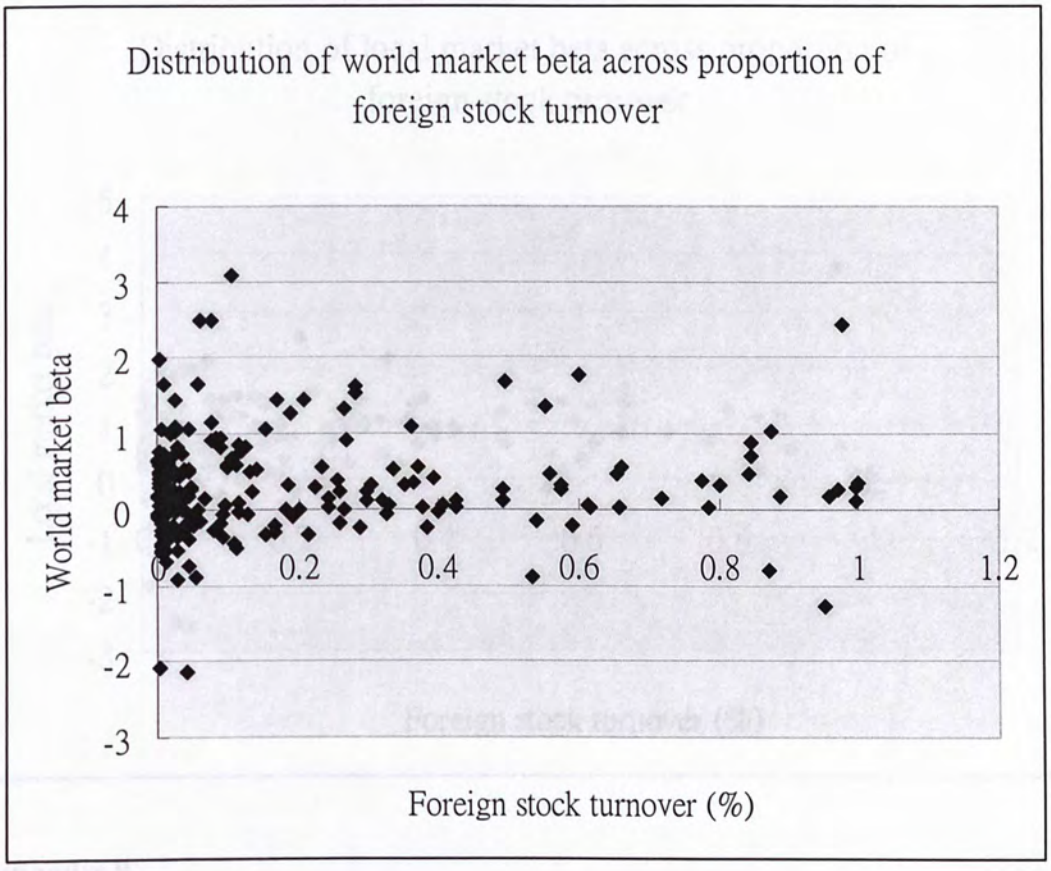
Appendix 5

Correlation matrix among five variables

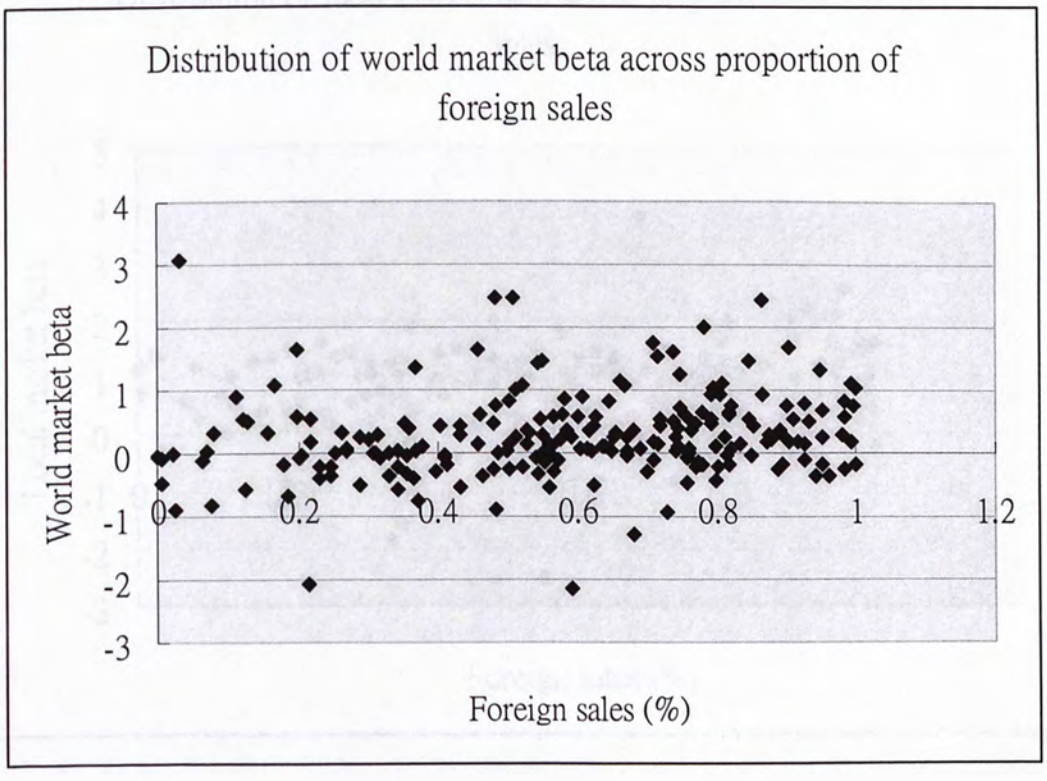
	λ	θ	β_f	β_l	β_e
λ	1	0.0691	0.0856	0.0459	0.0824
t - statistics		1.0153	1.2601	0.6727	1.213
θ		1	0.1845	0.1348	0.1578
t - statistics			2.752	1.9953	2.3428
β_f			1	-0.328	0.1183
t - statistics				-5.0854	1.7474
β_l				1	0.2209
t - statistics					3.3207
β_e					1

The formula for the t-statistics calculation for the correlation is
$r\ (n - 2)^{1/2} / (1 - r^2)^{1/2}$

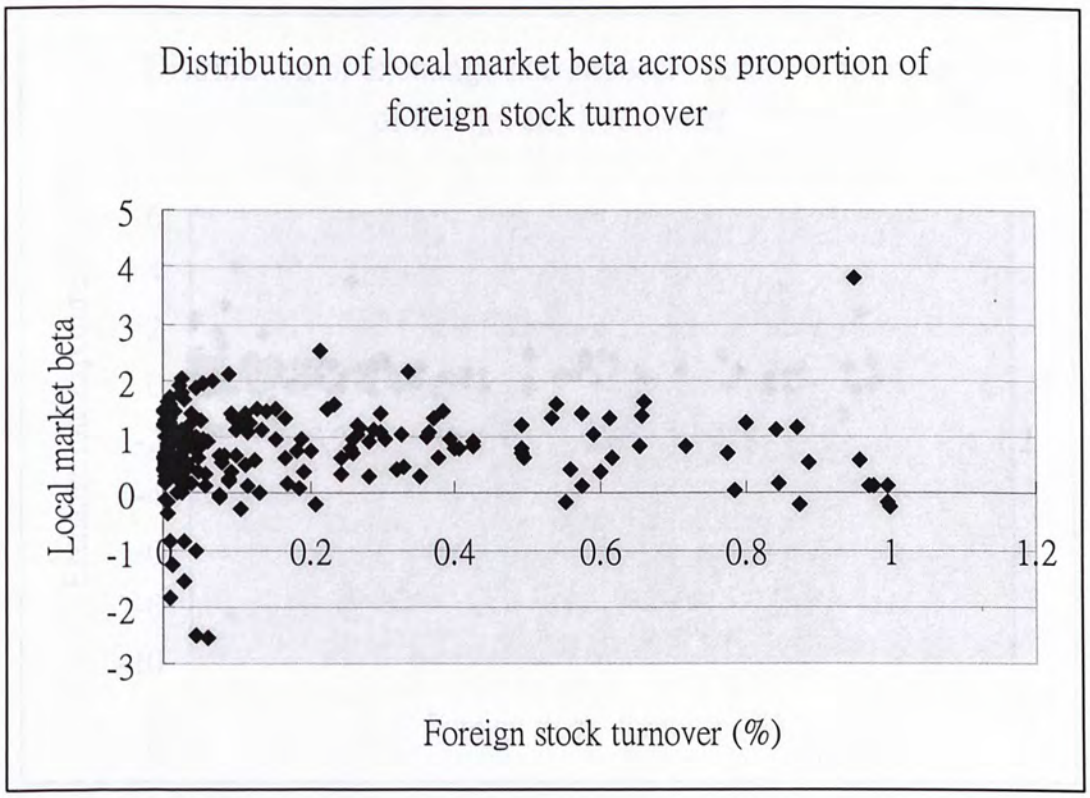
Appendix 6



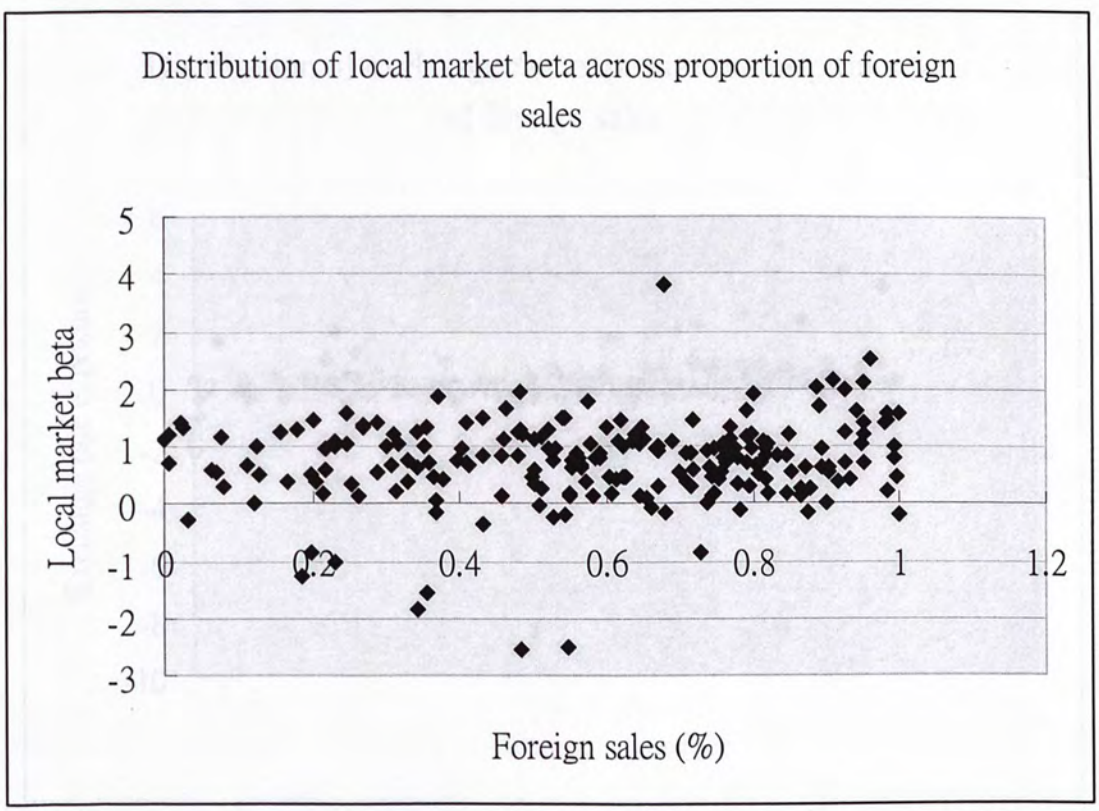
Appendix 7



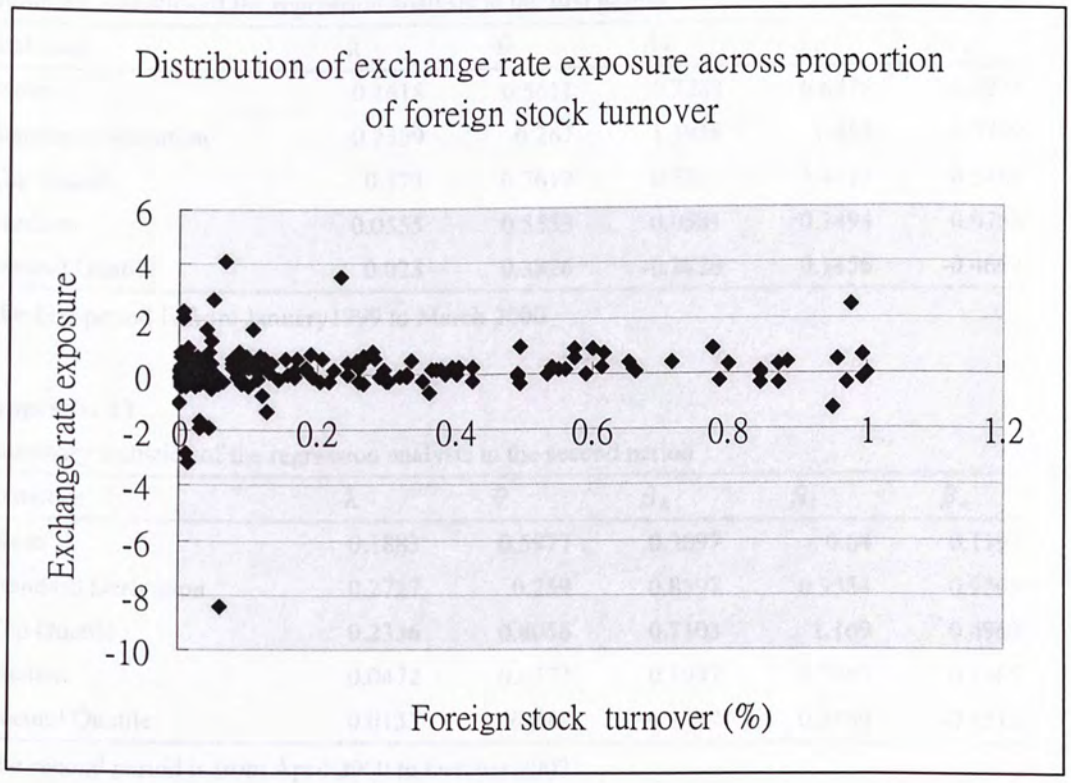
Appendix 8



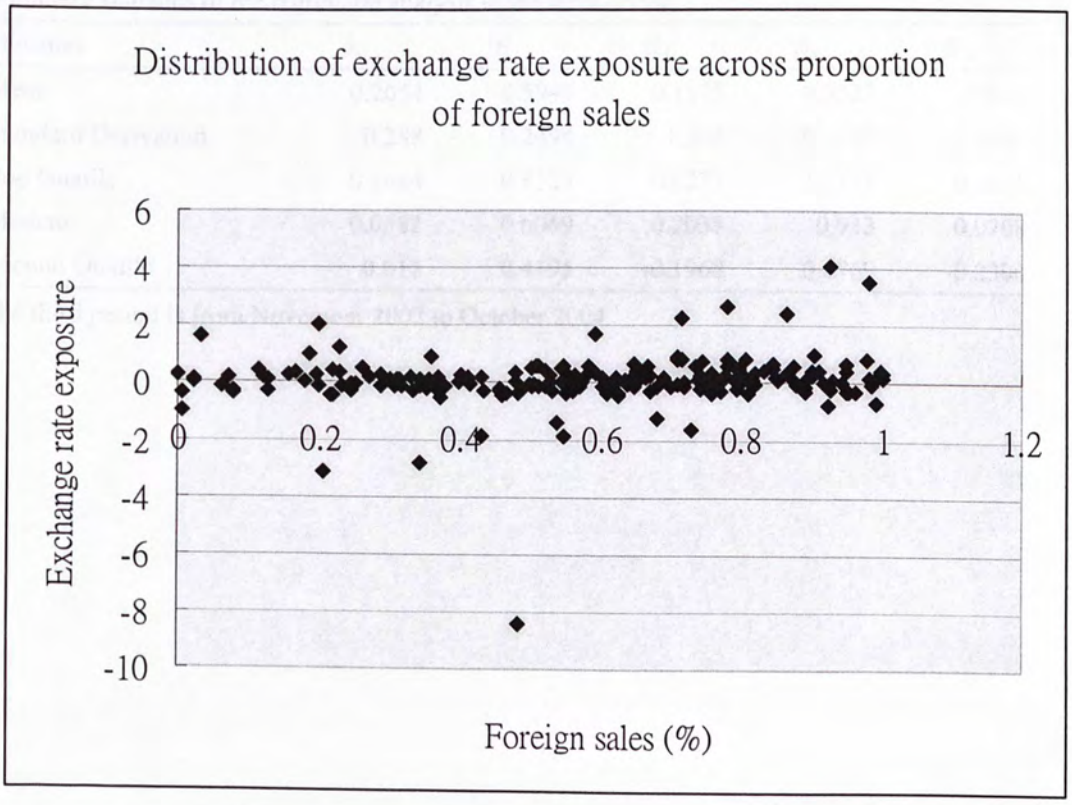
Appendix 9



Appendix 10



Appendix 11



Appendix 12

Summary statistics of the regression analysis in the first period

Statistics	λ	θ	β_f	β_l	β_e
Mean	0.1618	0.5611	0.3288	0.6475	-0.0274
Standard Derivation	0.2399	0.267	1.3958	1.454	1.3799
Top Quatile	0.173	0.7619	0.5081	1.4117	0.5468
Median	0.0555	0.5553	0.0581	0.7494	0.0768
Second Quatile	0.023	0.3826	-0.2826	0.1456	-0.4662

The first period is from January1999 to March 2000

Appendix 13

Summary statistics of the regression analysis in the second period

Statistics	λ	θ	β_f	β_l	β_e
Mean	0.1883	0.5977	0.3097	0.64	0.1191
Standard Derivation	0.2727	0.259	0.8597	0.9584	0.9509
Top Quatile	0.2336	0.8056	0.7103	1.109	0.4962
Median	0.0472	0.6273	0.1937	0.7863	0.1065
Second Quatile	0.0133	0.411	-0.1417	0.3569	-0.1518

The second period is from April 2000 to October 2002

Appendix 14

Summary statistics of the regression analysis in the third period

Statistics	λ	θ	β_f	β_l	β_e
Mean	0.2054	0.5949	0.1175	0.9535	0.21
Standard Derivation	0.288	0.2494	1.368	0.7159	1.1696
Top Quatile	0.2484	0.8123	0.6273	1.2748	0.6535
Median	0.0582	0.6069	0.2038	0.933	0.0708
Second Quatile	0.015	0.4195	-0.1968	0.4769	-0.2306

The third period is from November 2002 to October 2004

Appendix 15

Summary statistics of the regression analysis for the firms in developed market

Developed market	λ	θ	β_f	β_l	β_e
Australia	0.0683	0.5529	0.0079	1.1491	-0.0408
Denmark	0.0350	0.4954	-0.0072	1.2256	-0.0749
Finland	0.1484	0.9092	0.3452	0.5535	0.2342
France	0.0995	0.6945	0.1657	1.1129	0.1550
Germany	0.3475	0.6119	0.3977	0.7935	0.1355
Ireland	0.6306	0.6636	0.2858	0.9457	0.1913
Italy	0.1427	0.4208	0.0593	0.8809	0.2116
Japan	0.0279	0.4552	-0.0226	-0.0899	-0.5426
Netherlands	0.1612	0.6495	0.3068	0.8633	0.1106
New Zealand	0.0913	0.4085	-0.0750	1.4166	0.1947
Norway	0.1745	0.5506	0.0308	0.9755	0.0695
Singapore	0.2406	0.9587	0.9333	1.1271	-0.7395
Spain	0.1813	0.3278	0.0087	0.7508	0.2179
Sweden	0.0736	0.7263	0.0746	1.2871	-0.0304
Switzerland	0.0702	0.6236	0.8643	0.4410	0.3402
UK	0.0977	0.6022	0.4869	0.5191	0.1455

This paper use The Bank of New York country classification for the developed market

Appendix 16

Summary statistics of the regression analysis for the firms in emerging market

Emerging market	λ	θ	β_f	β_l	β_e
Argentina	0.8458	0.7473	0.7056	0.1776	-0.0385
Brazil	0.6294	0.4919	0.2367	0.3287	0.0647
Chile	0.4504	0.5759	0.2279	0.9254	-0.1092
India	0.2250	0.7502	0.2381	1.3885	2.5710
Israel	0.4446	0.7393	0.2015	1.1909	0.5174
Korea	0.0250	0.0010	-0.0354	1.1428	0.2931
Mexico	0.4960	0.2974	0.1655	0.7498	0.0421
South Africa	0.3262	0.2633	-0.3138	1.1584	-0.0553
Taiwan	0.1272	0.5380	-0.0652	1.5070	-1.3762
Turkey	0.1134	0.6886	0.0872	1.0962	0.1722

This paper use The Bank of New York country classification for the emerging market

Appendix 17

Summary statistics of the regression analysis for goods industry

Statistics	λ	θ	β_f	β_l	β_e
Mean	0.2064	0.6033	0.2484	0.6082	0.0283
Standard Derivation	0.2728	0.255	0.6915	0.7271	0.9575
Top Quatile	0.2963	0.7902	0.5439	0.9899	0.3557
Median	0.0621	0.6368	0.1509	0.6492	0.0677
Second Quatile	0.0194	0.4551	-0.1184	0.3145	-0.1855

Goods industry includes Aerospace & Defense, Automobiles & Parts, Beverages, Chemicals, Construct & Materials, Electricity, Electronic & Electric Equipment, Food & Drug Retailers, Food Producers, Forestry & Paper, Gas H20 & Multiutility, General Industrials, General retailers, Health Care Equipment & Services, Household Goods, Industrial Engineer, Industrial Metals, Industrial Transport, Leisure Goods, Mining, Oil & Gas Producers, Oil Equipment Services & Distribution, Personal Goods, Pharmacy & Biotechnology, Technology Hardware & Equipment, Tobacco.

Appendix 18

Summary statistics of the regression analysis for services industry

Statistics	λ	θ	β_f	β_l	β_e
Mean	0.1653	0.5339	0.3046	1.0144	0.1943
Standard Derivation	0.2411	0.2644	0.6181	0.6339	0.8345
Top Quatile	0.2253	0.7751	0.5427	1.4104	0.31
Median	0.0466	0.5155	0.2388	1.0835	0.1402
Second Quatile	0.0091	0.3344	-0.0693	0.7094	-0.1202

Services industry includes Banks, Fixed Line Telecom, General Finance, Life Insurance, Media, Mobile Telecom, Nonlife Insurance, Software & Computer Services, Support Services, Travel & Leisure,